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A BIOLOGICAL EVALUATION OF PORCUPINE DAMAGE ON THE GOOSENEST RANGER DISTRICT, KLAMATH NATIONAL FOREST

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ABSTRACT

Porcupines are causing significant damage to ponderosa pine seedlings and saplings in plantations throughout the Goosenest Ranger District. It is unlikely that timber management objectives will be obtained without some control effort. Management alternatives that can be integrated with silvicultural prescriptions are presented. Control of porcupines should help reduce the probability of repeated injuries and help prevent long-term impacts on timber production.

INTRODUCTION

In response to a Forest Detection Report, several ponderosa pine plantations on the Goosenest Ranger District were examined on May 25, 1989 by Rus Kazmierczak, District Silviculturist; Ken Zarzynski, Reforestation Culturist; Dave Schultz, Entomologist, Nothern Service Area, and John Borrecco, Animal Damage Specialist, Regional Office. The purpose of the visit was to identify the pest causing barking injuries on ponderosa pine seedlings and saplings, and to evaluate the impact of these injuries. The timber management objective for all stands visited is to grow trees for sawlog production.

OBSERVATIONS

All sites visited consisted of ponderosa pine plantations with scattered overstories of large mature trees. Sites were generally flat with either cheatgrass or bitterbrush understories. This discussion will be based primarily on observations at the Whaleback plantation since injuries were most recent on that unit. However, the levels of injuries and the nature of the problem are similar on all the units visited and throughout the District.

Seedlings and saplings from 1 to 10 feet tall had sustained barking injuries on the main stems. The bark was obviously gnawed from the boles. These injuries are causing the death of some trees, especially the smaller seedlings, and dead tops and misshapen crowns in others. Horizontal tooth marks were prominent on

freshly injured trees and small bark chips and clipped needles were found at the base of these trees. These are common indicators of porcupine feeding activity. We also found both old and fresh porcupine fecal pellets on the ground under the large roost trees scattered throughout the plantation. The Forest Detection Report indicated that District wide levels of injury range from 15 to 30 percent of the trees. The level of injuries in the Whaleback site is at least 30 percent and feeding activity is continuing.

BIOLOGY OF VERTEBRATE PEST

Porcupine (Erethizon dorsatum)

The porcupine is a large rodent that is easily identified by the stiff quills that cover most of the upper body. Porcupines are basically nocturnal and solitary in habit, although concentrations of animals may occur near winter dening sites or in attractive food patches like alfalfa fields. Stocking and age of pine stands, type of ground vegetation, availability of water, and occurrence of den sites or roost trees are important habitat factors (Lawrence 1957). Daily movements, resting locations, and habitat use are strongly influenced by food availability and food habits (Smith 1982).

Generally, porcupines feed on herbaceous ground vegetation during the spring and summer seasons (April through August). During this period they commonly rest in trees or dens during the day and feed from dusk to dawn especially in meadows, riparian areas, or wherever succulent herbaceous vegetation can be found. Alfalfa fields also are attractive since they provide abundant supplies of the lush herbaceous vegetation preferred by porcupines. Movements between daily resting locations tend to be extensive.

As ground vegetation dries out or is covered with snow, porcupines start feeding almost exclusively in trees on phloem and needles. Dwarf mistletoes also appear to be a preferred food item during the fall (Lawrence 1957). With the arrival of winter weather, porcupine movements decrease substantially. Movements tend to be short trips from one tree to the next, or from dens to trees in the immediate area of the dens. Animals often remain in one area for many days, particularly during stormy weather.

Porcupines prefer to rest in large sized trees and these trees are used repeatedly and often by several animals. Dens also appear to be used by more than one animal, although seldom at the same time. Porcupines also prefer dense stands of young trees like pine plantations for feeding. The availability of lush herbaceous vegetation during the spring and summer, and young trees in or near stands of large trees during the fall and winter, appears to have the greatest influence on porcupine habitat use.

The breeding season occurs during the fall (September to December) and single young are born in the spring from April through June. Dens in rock out-croppings or talus slopes, or other protected situations like slash piles or downed logs are used for giving birth. Young are born well developed and are dependent upon their mothers for a brief time only. This low rate of reproduction is one reason why it is possible to effectively control this animal with hunting.

While the quills provide excellent protection from some predators; cougar, bobcat, coyote, fisher, bear, and other predators do take porcupines (Hooven 1971). Fishers are especially effective predators and have been credited with significantly reducing porcupine populations in the Northeast and Lake States following reintroductions or natural increases in fisher numbers (Cook and Hamilton 1957, Earle and Kramn 1982).

DISCUSSION

Porcupines commonly feed on both the inner bark and foliage of conifers, especially ponderosa pine (Clark 1986, Lawrence et al. 1961). Feeding injuries are characterized by prominent horizontal or oblique tooth marks (1/8-inch wide) in the sapwood. Supplemental field signs include bark chips, clipped needles, quills, and oblong fecal droppings found at the base of barked trees. While porcupines may cause injuries to trees of all ages, young trees up to pole size are most susceptible. The thin, smooth bark of younger trees is preferred. On ponderosa pine seedlings, barking is often basal. Injuries in older trees are usually confined to the thin, unplated bark of the upper crown. Lawrence (1957) described three types of damage: (1) top barking which frequently results in killing the terminal and several whorls of branches, (2) basal barking which can girdle and kill the whole tree, and (3) clipping of small branches or seedlings.

Where barking injuries cause girdling the results are obvious: death of trees, dead tops, and misshapen crowns. In young saplings, single occurrences of extensive barking without girdling and even some top-girdling may cause no serious defects unless trees are weakened and become more susceptible to attacks by insects or diseases. Repeated injuries to a tree increase the probability of girdling and serious deformities that reduce the tree's value for lumber. These types of injuries are less important where trees are grown for firewood or other fuel and fiber products. However, injuries do reduce the amount of annual growth and can effect long-term fiber production.

The impact of losing young seedlings can be lessened somewhat by replanting, but losses of saplings and older trees are hard to overcome. This emphasizes the need for vigilance in young susceptible stands and the need to take corrective measures to prevent significant levels of damage. The Animal Damage Control Handbook (FSH 2609.22) recommends considering control of porcupines in managed stands where 3 percent or more of the trees are being damaged annually. While levels of damaged trees throughout the District are already significant, control of porcupines should help reduce the probability of repeated injuries and help prevent long-term impacts on timber production.

MANAGEMENT OPTIONS

No Action. Porcupines will continue to cause barking injuries resulting in mortality of some smaller trees and deformity or dead tops in other trees. Levels of damage will increase over time and individual damaged trees will probably be fed upon repeatedly contributing to deformity. It is unlikely that silvicultural objectives of growing trees for a sawlog market would be obtainable. Stands could still meet other resource objectives and a timber management objective of providing firewood or hog fuel.

Silvicultural treatments. Removal of the large overstory trees and control of understory and ground vegetation within plantations would reduce the attractiveness of these sites to porcupines. However, the fact that rock out-croppings are also present throughout the District would reduce the effectiveness of these treatments without some additional direct control of porcupines.

Biological Control. The fisher is an effective predator of porcupines and should be protected in areas where it occurs. While protecting or reintroducing fishers or other predators may help reduce porcupine populations, it is unlikely that this alone will prevent or control porcupine damage. Predators certainly can help keep porcupine populations at low levels following a successful direct control program.

Plastic Tubing. Individual seedling protectors like plastic tubing can be used to protect newly planted seedlings. However, once a seedling has grown above the top of the tube porcupines can climb the tree and cause damage. This is not an effective approach to solving the damage problem addressed in this evaluation.

Fencing. Fencing animals out of an area is possible but generally limited by cost to small areas of high value like research or progeny test sites. Electric fences are effective when the electric wire is placed about 2 inches above 18-inch high poultry wire or wire mesh fencing (Schemnitz 1983). Climbing of fences also can be discouraged by placing a overhanging wire strip around the top of the fence at a 65 degree angle to the vertical fence. Probably the most practical use of fencing is to intercept porcupine movements and to direct the animals toward traps. A wire mesh drift fence as low as 24 inches can be used to help direct porcupines to traps set in openings or at the ends of the fence. Fences can also be constructed out of 30-inch wide metal flashing.

Trapping. Porcupines can be easily caught using a No. 2 leghold trap or a conibear 330 trap placed in the entrance to a den or trap ring (see FSH 2609.22). Trap rings are most effective if placed on the perimeter of new plantations in areas with a history of porcupine problems. Animals are drawn to the ring by strong odors like apple, rancid bacon fat or cat food. Trapping has the hazard of taking non-target animals and the disadvantage that traps must be checked at frequent intervals. While not required by law, I recommend checking of leg hold traps daily to release non-target animals. Offset jaws are required on the No. 2 and larger leghold traps. Check the Fish and Game Code of California, sections 4004 and 4152 before initiating a trapping program.

Hunting. Hunting is the most species specific and effective method available for controlling porcupine damage. Knowledge of porcupine movements and habits is important in timing of hunting. Hunting with a trained dog can greatly improve success and extend effective hunting periods.

Daytime hunting is most effective when animals can be tracked on snow. This is usually possible during late fall, winter, or early spring. Porcupines tend to be quite active following snowstorms and tracks and droppings are easily seen. Animals also are more likely to found near where fresh damage is occurring.

Night road hunting using a spotlight is recommended during the breeding season in late summer or early fall. Make sure you coordinate this with the California Department of Fish and Game prior to initiating a program.

Early morning and late evening hunting in moist meadows, along stream margins, or wherever succulent herbaceous vegetation can be found is recommended during spring and early summer.

Random or recreational shooting of porcupines is not likely to provide the intensity of effort needed to obtain effective control. For hunting to be successful it needs to be a persistent and well organized endeavor. This will probably be easier to accomplish by contracting with either APHIS-ADC personnel or private contractors.

A combination of control methods may be required to provide effective control. It is extremely important to obtain data on current levels of porcupine damage and to monitor the effectiveness of control efforts in reducing damage to trees.

Integrated pest management refers to the integration of specific treatments for reducing and/or preventing pest damage with on-going silvicultural prescriptions. The available options may not be appropriate in given situations. Specific pest and forest management prescriptions are written by the forest manager in light of the needs of the stand, and objectives for the stand.

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